

CLAIMS

1. A β 1,3-N-acetyl-D-galactosamine transferase protein which transfers N-acetyl-D-galactosamine to N-acetyl-D-glucosamine with β 1,3 linkage.
2. The glycosyltransferase protein according to claim 1, which has at least one of the following properties (a) to (c):
 - (a) acceptor substrate specificity
 - when using an oligosaccharide as an acceptor substrate, the protein shows transferase activity toward Bz- β -GlcNAc, GlcNAc- β 1-4-GlcNAc- β -Bz, Gal- β 1-3-(GlcNAc- β 1-6) GalNAc- α -pNp, GlcNAc- β 1-3-GalNAc- α -pNp and GlcNAc- β 1-6-GalNAc- α -pNp ("GlcNAc" represents an N-acetyl-D-glucosamine residue, "GalNAc" represents an N-acetyl-D-galactosamine residue, "Bz" represents a benzyl group, "pNp" represents a p-nitrophenyl group, and "-" represents a glycosidic linkage. Numbers in these formulae each represent the carbon number in the sugar ring where a glycosidic linkage is present, and " α " and " β " represent anomers of the glycosidic linkage at the 1-position of the sugar ring. An anomer whose positional relationship with CH₂OH or CH₃ at the 5-position is *trans* and *cis* is represented by " α " and " β ", respectively);
 - (b) reaction pH
 - the activity is lower in a pH range of 6.2 to 6.6 than in other pH ranges; or
 - (c) divalent ion requirement

although the activity is enhanced at least in the presence of Mn^{2+} , Co^{2+} or Mg^{2+} , the Mn^{2+} -induced enhancement of the activity is almost completely eliminated in the presence of Cu^{+} .

5 3. A glycosyltransferase protein which comprises the following polypeptide (A) or (B):

(A) a polypeptide which has the amino acid sequence shown in SEQ ID NO: 2 or 4; or

(B) a polypeptide which has an amino acid sequence with
10 substitution, deletion or insertion of one or more amino acids in the amino acid sequence shown in SEQ ID NO: 2 or 4 and which transfers N-acetyl-D-galactosamine to N-acetyl-D-glucosamine with $\beta 1,3$ linkage.

4. The glycosyltransferase protein according to claim 3,
15 wherein the polypeptide (A) consists of a polypeptide having an amino acid sequence covering amino acids 189 to 500 shown in SEQ ID NO: 2.

5. The glycosyltransferase protein according to claim 3,
wherein the polypeptide (A) consists of a polypeptide
20 having an amino acid sequence covering amino acids 36 to 500 shown in SEQ ID NO: 2.

6. The glycosyltransferase protein according to claim 3,
which consists of a polypeptide having an amino acid
sequence sharing at least more than 30% identity with an
25 amino acid sequence covering amino acids 189 to 500 shown in SEQ ID NO: 2 or amino acids 35 to 504 shown in SEQ ID NO: 4.

7. A nucleic acid consisting of a nucleotide sequence

encoding the polypeptide according to any one of claims 3 to 6 or a nucleotide sequence complementary thereto.

8. The nucleic acid according to claim 7, which consists of the nucleotide sequence shown in SEQ ID NO: 1 or 3 or a
5 nucleotide sequence complementary to at least one of them.

9. The nucleic acid according to claim 7, which consists of a nucleotide sequence covering nucleotides 565 to 1503 shown in SEQ ID NO: 1 or a nucleotide sequence complementary thereto.

10 10. The nucleic acid according to claim 7, which consists of a nucleotide sequence covering nucleotides 106 to 1503 shown in SEQ ID NO: 1 or a nucleotide sequence complementary thereto.

11. The nucleic acid according to claim 7, which consists
15 of a nucleotide sequence covering nucleotides 103 to 1512 shown in SEQ ID NO: 3 or a nucleotide sequence complementary thereto.

12. The nucleic acid according to any one of claims 7 to 11, which is DNA.

20 13. A vector carrying the nucleic acid according to any one of claims 7 to 12.

14. A transformant containing the vector according to claim 13.

15. A method for producing a β 1,3-N-acetyl-D-
25 galactosamine transferase protein, which comprises growing the transformant according to claim 14 to express the glycosyltransferase protein and collecting the glycosyltransferase protein from the transformant.

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16. An antibody recognizing the β 1,3-N-acetyl-D-galactosamine transferase protein according to any one of claims 1 to 6.